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09/17/1990 07/17/99 LEBE

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LEBE & LEBE
10100 SANTA MONICA BOULEVARD
SUITE 2200
LOS ANGELES CA 90067-4164

EXAMINER

CLEVELAND, M

ART UNIT

PAPER NUMBER

1/62

6

DATE MAILED: 02/17/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.
09/297,483

Applicant(s)
Seki et al.

Examiner
Michael Cleveland

Group Art Unit
1762



☒ Responsive to communication(s) filed on Jul 19, 1999

☐ This action is FINAL.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 35 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claim

☒ Claim(s) 1-20 is/are pending in the application

Of the above, claim(s) _____ is/are withdrawn from consideration

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1-20 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☒ None of the CERTIFIED copies of the priority documents have been

☒ received.

☐ received in Application No. (Series Code/Serial Number) _____

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s) _____

☐ Interview Summary, PTO-413

☒ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:

The specification contains material in brackets (for example, at p. 9, line 9). However, the enclosed words appear to belong and are grammatically necessary. Does Applicant intend any significance to this material?

Each Figure (i.e., "Figs. 1A, 1B, ... and 1E") must be listed separately in the Brief Description of the Drawings.

There is no key for the symbolic results in Tables 11, 13, 19, and 20.

Cathode 110 is misidentified as cathode 100 on p. 23.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1-7 and 17: The term "type" ("an ink-jet type recording head") renders the claims vague and indefinite because it is unclear what the scope of the claim is.

Claims 1-7: The term "...the content of the conductive compound is in the range of 0.01 wt% to 10 wt%." is vague and indefinite because it is unclear whether the conductive compound is composed of some element present in the given range or that the conductive compound makes up 0.01-10% of the ink. The Examiner assumed the latter.

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Claims 1, 4, and 6-7: The contact angle is not a feature of the composition alone, but relies on the intended use of the composition. In particular, it depends on the material of the nozzle face.

Claim 8 fails to further limit the parent claims 1-7 because a compound must have either a high molecular weight or a low molecular weight. (If Applicant contends that there exists a class of "medium molecular weight compounds," then the terms "high" and "low" are vague and indefinite because they are not defined in the specification, and one of ordinary skill in the art would not be able to interpret the scope of the claims.

Claims 9-13, as written, specify that the conductive compound is present as a polar solvent. The Examiner recommends changing the phrase "in the solvent as a polar solvent" to "and the solvent is a polar solvent", as being more clearly in accordance with the disclosure.

Claims 11 and 12 are improper because Cellosolve appears to be a trade name.

Claims 14-20 are objected to for containing (by dependence) the formal problems identified above.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

5. Claims 1-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Itoh (U.S. Patent 5,690,721, hereafter '721).

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*721 discloses ink jet inks comprising a solvent (water), a colorant, and a water-soluble organic solvent (Abstract). The inks may include conductive additives, such as resistance modifiers, such as sodium chloride (col. 7, lines 13-19), cationic or anionic surfactants (col. 7, lines 59-66). Examples A5, A8, and A10 demonstrate inks containing about 0.9 % by weight sodium EDTA.

Claims 1-7: While the reference does not disclose the surface tensions or viscosities of the above Examples, the Examiner assumes that they are within the inventors' disclosed ranges of 25-70 dyn/cm and 1-10 cP, respectively (col. 7, lines 42-55). The contact angle of the ink depends on the intended use of the ink, but the disclosed ink is inherently capable of forming a contact angle within the range of 30-170 degrees.

Claim 8: Sodium EDTA is a low-molecular weight compound.

Claim 9: Sodium EDTA is either soluble or dispersible in the liquid.

Claims 10-15: The organic solvent may be glycerin or ethoxyethanol (col. 6, lines 36-64). The ink may include ethanol (Examples A5, A8, A10).

Claim 16: Example A10 discloses an ink that undergoes a dispersion step (via agitator mill) and a filtration step. However, the patent suggests equivalent dispersion methods such as sonication (col. 9, lines 45-48).

*721 also teaches that the water may be filtered (col. 7, line 1) and then the ink dispersed by sonication (col. 9, lines 45-48).

6. Claims 1-10 and 12-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Taniguchi et al. (U.S. Patent 5,667,572, hereafter *572).

*572 teaches a water-based ink jet composition comprising water (col. 7, lines 60-67) and preferably a water-soluble resin. The water-soluble resin may be an ionic polymer (col. 8, lines 1-32). In such a case, the polymer is present in an amount from 0.01-10 % by weight (col. 8, lines 41-46). The preferred viscosity is 1-10 cP. The preferred surface tension is 25-70

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dyn/cm (col. 9, lines 15-25). The contact angle depends on the intended use of the ink, but the disclosed ink is inherently capable of forming a contact angle of 30-170 degrees.

Claim 8: The polymer molecular weight is 2000-1,000,000 (i.e., high or low) (col. 8, lines 33-40).

Claim 9: The polymer is water-soluble (col. 8, lines 1-32).

Claims 10 and 12-15: The ink preferably contains a water-soluble organic solvent, such as glycerin or ethoxyethanol (col. 7, lines 31-57).

Claim 16: The water may be purified by ultrafiltration (col. 7, lines 60-63), and the ink may be dispersed by sonication (col. 11, lines 7-10).

7. Claims 1-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Adamic et al. (U.S. Patent 5,188,664, hereafter '664).

Example 1 discloses an ink-jet ink comprising 0.07 wt. % of ammonium phosphate (a conductive, low-molecular weight compound) in a solvent (water). The viscosity is about 1.3 cP, and the surface tension is about 65 dyn/cm.

Claims 1, 4, 6, and 7: The contact angle of the ink depends on the intended use of the ink, but the disclosed ink is inherently capable of forming a contact angle within the range of 30-170 degrees.

8. Claim 18 is rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Shieh et al. (U.S. Patent 5,641,611, hereafter '611).

Note that '611 contains pages of corrected figures at the end of the patent.

Fig. 10 shows an embodiment in which a light-emitting diode is formed by depositing a dielectric layer (i.e., a partitioning member), and patterned to form openings. A light emitting diode is then formed in the openings (col. 5, lines 55-67). Figure 8 demonstrates that such an LED is formed by depositing three layers, the first of which is a hole transporting layer. Thus the

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product in Figure 10 appears to have all the structural features resulting from the method of claim 17.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1-7 and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roitman (U.S. Patent 5,972,419, hereafter '419) in view of Yatake (U.S. Patent 5,560,770, hereafter '770).

'419 teaches the manufacture of an EL device via formation of a mask that is patterned to form pixels, and the inkjet deposition of an electroluminescent material (a conductive material) into the created wells. Electroluminescent materials inherently have some hole-injecting and transporting function. The droplets are then dried. '419 is silent as to the concentration of the ink or its contact angle with the ink jet nozzle surface.

However, the concentration of the active component in ink-jet compositions and the surface angle of the composition with the nozzle material are known as result-effective parameters (col. 2, lines 40-64 and col. 6, lines 35-67). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized the concentration and surface angle.

11. Claims 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over '611 as applied to claim 18 above, and further in view of any one of VanSlyke et al. (U.S. Patent 5,059,862, hereafter '862), Shi et al. (U.S. Patent 5,554,450, hereafter '450), Shi et al. (U.S. Patent 5,817,431, hereafter '431), or Tang (U.S. Patent 4,356,429, hereafter '429).

'419 and '770 (or '611 alone) teach(es) the limitations of claim 18, but are silent as to the thickness, film resistance, and material of the hole transport layer.

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The thickness of layers in EL devices is known to be a result-effective variable. For instance, see '862, which discloses a device which uses a hole transporting layer of copper phthalocyanine of 375 angstroms (col. 14, lines 38-41). Similarly, '450 (col. 22, lines 35-37), '431 (col. 5, lines 50-59), and '429 (col. 5, lines 9-24) disclose hole-transporting layers of copper phthalocyanine of 150, 250, and 1000 angstroms, respectively. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized the thickness of the hole transport layer for best results.

The prior art of record is silent as to the film resistance of the hole transporting layer. Applicant's disclosure (particularly Table 13) suggests that the resistance is an inherent property that depends on the thickness of the film and the deposition method. The Examiner recognizes that the above described prior art deposits layers of copper phthalocyanine via a vapor deposition process, whereas Applicant deposits copper phthalocyanine via an ink jet deposition process. (Thicknesses that achieve Applicant's claimed range of resistances range from 200-1400 angstroms, as described in Table 13.) Therefore, the layers described in '862, '450, '431, and '429 would reasonably appear to inherently possess resistances in Applicant's claimed range. However, the PTO does not have testing facilities to determine the resistances. A showing that the resistances of the hole transporting films of the prior art are outside Applicant's claimed range would result in the withdrawal of this rejection for claim 20.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Cleveland whose telephone number is (703)308-2331. The examiner can normally be reached on Monday-Friday from 8:30 a.m. to 4:00 p.m.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck, can be reached at (703) 308-2333.



Michael Cleveland

February 14, 2000



Shrive Beck
Supervisory Patent Examiner
Technical Center